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ABSTRACT

This study involved the use of interspersed questions as an instructional procedure to aid improvement in reading efficiency. Subjects, 86 college students enrolled in an undergraduate course in methods for teaching secondary reading, practiced (five times) reading nonfiction narrative selections, trying to increase their reading speed. The control group read each selection entirely and answered all ten questions, while the experimental group read half of each selection and answered only five questions. Results showed greater gains in reading efficiency by the experimental group. (JM)

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The Effect of Interspersed Questions on Development of Reading Efficiency

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The Effect of Interspersed Questions on
Development of Reading Efficiency

Rationale

Many studies have been conducted on conditions which facilitate comprehension in reading and learning from text. A review of research by Anderson and Biddle(1975) shows that a major interest has been in the effects of two conditions: the type and positioning of questions. Among those studies, those by Rothkopf(1965), Frase(1968), and Frase, Patrick, and Schumer(1970) are of particular interest to the research reported here because they investigated the effects of interspersed questions, more specifically, of different degrees of proximity of questions to the material which the questions covered. The results of these studies indicated that the closer in proximity the questions were to the material, the better the performance.

An important point not noted by Anderson and Biddle is this: manipulation of the proximity of questions also involves manipulation of the length of material to be read and the number of questions answered at one time. For example, in the Frase study(1968), one group read material one paragraph at a time and answered one question after each paragraph. Another group read two paragraphs at a time and answered two questions.

Rickards(1975), in a discussion of the Anderson and Biddle review, noted that most of the studies involved "questions requiring literal recall of specific facts(p. 602)."

In his study, Rickards was concerned with, what he termed, "meaningful learning," as defined by Ausubel(1968), or what might be called comprehension beyond the literal level. In addition, Rickards used interspersed statements rather than questions. His study demonstrated the effectiveness of interspersed advanced organizers, or superordinate prestatements, in facilitating recall of related concepts, related facts, and unrelated concepts.

A more recent study (Kuehls, 1976) found that students with average and below average achievement in mathematics performed better (with significant differences) on a test after reading material with interspersed questions than did a group who read a regular text. There were no significant differences, though, between groups with high achievement who were exposed to interspersed questions and regular text.

This study involved a use of interspersed questions not previously investigated: as an instructional procedure to aid improvement in reading efficiency. Improvement in reading efficiency is commonly measured as an increase in rate with maintenance of a sufficient level of comprehension (75 to 80 percent). Though procedures and materials may differ from one course to another, it appears that instruction in reading efficiency, essentially, requires a student to force himself to practice reading at increasingly

higher rates until the student can read at a high rate while performing successfully on a comprehension test and feeling comfortable at that rate.

This investigator surmised that a procedure based on the idea of interspersed questions would serve to compensate for the emphasis on rate. With comprehension made easier, (1) students would have less difficulty in maintaining a sufficient level of comprehension while pushing their rate, and (2) as a result, students would achieve greater gains in reading efficiency than students who did not use the procedure.

The Study

Subjects. Subjects were 86 college students enrolled in four sections of an undergraduate course in methods for teaching secondary reading. The first part of the course covered developmental reading and study skills. As one part of their work, students practiced exercises that had been found effective in increasing reading efficiency. (Wilhelm & Wolter, 1974).

Materials. The prose selections, from Reading Improvement Program (St. Louis: Perceptual Development Laboratories, 1956), are typical of those found in reading kits or programs. Selections were complete in themselves with length kept constant (in this case 2000 words).

Readability, as measured by the Flesch Formula (Flesch, 1949), was controlled. Selections were nonfiction narratives. Content of the selections varied.

Selections were followed by a comprehension test of ten multiple-choice questions. Each set of questions had two calling for recall of a main idea and one, for recall of a relationship; two calling for an inference; and the rest, recall of details.

Procedures. Except for the placement of questions, procedures were the same for all subjects. Subjects took a pre-test in which they were asked to read at a comfortable rate. The instructor recorded on the board the time in minutes and intervals of ten seconds, as it passed. When students finished reading, they noted the amount of time they had taken to read the selection. Using a rate-time conversion table provided in the material, they determined their rate (average number of words per minute). They answered the test questions by noting the letter of the correct answer, then checked their answers with a key provided in the material.

Rate and comprehension were recorded on a double graph. In subsequent practices, students set, for themselves, a specific objective for an increase in rate (e.g., an increase in 40 to 50 words faster in average number of words per minute). On the second practice, students simply pushed their rate. On other exercises, students were paced; that is, the instructor called out the passing

time in minutes and half minutes. Students were told to increase their rate as long as comprehension was 80 percent or higher. If comprehension dropped below 80 percent, they were told to stay at their highest rate on the next practice. Students practiced five times.

The control group, 40 students, read the entire selection (2000 words) and then answered all ten questions. The experimental group, 46 students, read one-half a selection each exercise and answered five questions. As a result, for the experimental group, (1) the length of material per exercise was 50 percent shorter, (2) there were half as many questions per practice, and (3) five of each set of questions were in closer proximity to the answers than was the case with the control group's exercises. For the control group, percent of comprehension was computed by scoring ten points for each question answered correctly; for the experimental group, 20 points per question.

Hypothesis. Subjects practicing with interspersed questions will make greater gains in reading efficiency than those in the control group.

Analysis of Data

To provide data, the performance of each subject on the first and last trials was "scored" by multiplying the rate (average number of words per minute) by the percent of comprehension. It has been common practice in reading improvement programs to measure reading efficiency

or "rate of comprehension" by a multiple of rate and comprehension rather than by two separate measures (Miller, 1970). Mean scores and a t-test for difference between two independent means were computed.

Results

Group scores on the first trial were compared to determine whether or not significant differences were present before instruction. There were no significant differences. For the control group, the mean score was 287.80 (S.D.=64.8); for the experimental group, 303.11 (S.D.=169.5); with t=.54 and $p < .50$. Table 1 presents the data.

A comparison of the groups' scores on the last trial showed significant differences. For the control group, the mean score was 369.58 (S.D.=24.9); for the experimental, 490.41 (S.D.=140.4), with t=5.36 and $p < .001$. Table 1 presents the data.

Table 1 about here

Limitations

In interpreting results, five limitations should be considered:

(1) Subjects were enrolled in an education course rather than an actual reading improvement course. They did the exercise as a means to learn methods for teaching

rather than to improve their own reading skills.

(2) Subjects used special procedures and materials designed to facilitate improvement in reading efficiency.

(3) No attempt was made to assess the "transfer" of the procedures or practice to other reading performances.

(4) Subjects exhibited no reading problems (as evidenced by rate and comprehension scores).

(5) No attempt was made to compare effects of some of the variables involved in the procedure; e.g. the point value for questions, the more immediate knowledge of results, the possible effect of answering the first five questions and checking answers on success in answering the next five on the second half of the article.

Discussion

The results of the study lend further support to the effectiveness of interspersed questions in facilitating comprehension. There is considerable support for the effectiveness of interspersed questions in promoting improvement in reading efficiency. The experimental group's scores were significantly different from those of the control group on the last trial. It would be useful to examine the effect of the procedure with students in college and secondary developmental reading courses and students with deficiencies in rate and/or comprehension.

Table 1

Experimental N = 46		Control N = 40		t
Mean	S.D.	Mean	S.D.	
303.11	169.5	287.80	64.8	.54*
490.41	140.4	369.58	24.9	5.36**

*p < .5

**p < .001

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